

The Profile of the Educational Program in Specialty 141 “Power engineering, electrical engineering and electromechanics”, the educational program “Electrotechnical systems of power consumption”

1 – General information	
Official name of educational institution	O.M. Beketov National University of Urban Economy in Kharkiv
Name of qualification and title conferred in original language	Bachelor Bachelor of Electrotechnical systems of power consumption
Official name of educational program	Electrotechnical systems of electricity consumption
Type of diploma and scope of educational program	Bachelor’s diploma, single, 240 ECTS credits, 3 years 10 months
Accreditation availability	Ministry of Education and Science of Ukraine Certificate of accreditation UD №21008296 The certificate expires on 01.07.2028.
Cycle/level	First (Bachelor) level the National Qualification Framework – level 6 FQ-EHEA – the first cycle EQF-LLL – level 7
Access requirements	complete secondary education or the degree of junior specialist
Language(s) of instruction	Ukrainian
Official length of program	5 years
Internet address for the permanent description of the educational program	http://eog.kname.edu.ua
2 – Purpose of educational program	
Learn how to solve specialized problems and practical problems in the field of electrical engineering, which involves the application of theories and methods of modern science of electricity, electrical engineering and electromechanics and is characterized by the complexity and uncertainty of the conditions.	
3 – Educational program specifications	
Subject area	<p><i>Objects of study and activity:</i></p> <ul style="list-style-type: none"> – enterprises of the electric power complex, electrotechnical and electromechanical services of organizations; – generation, transmission, distribution and conversion of electrical energy at power plants, power grids and systems; electrotechnical equipment, electromechanical and switching equipment, electromechanical and electrotechnical complexes and systems. <p><i>Learning objectives:</i></p> <p>Training of specialists capable of solving specialized problems and practical problems of power engineering, electrical engineering and electromechanics, which involves the application of theories and methods of physics and engineering sciences, characterized by complexity and uncertainty of conditions.</p> <p>Theoretical content of the subject area: basic concepts of the theory of electric and electromagnetic circuits, modeling, optimization and analysis of modes of operation of electrical stations, networks and</p>

	<p>systems, electric machines, electric drives, electrical and electromechanical systems and complexes using traditional and renewable energy sources.</p> <p>Methods, techniques and technologies: analytical methods for calculating electrical circuits, power supply systems, electrical machines and apparatus, control systems for electrical and electromechanical systems, electrical loads using specialized laboratory equipment, personal computers and other equipment.</p> <p>Tools and equipment: controls, electrical and electronic devices, microcontrollers, computers.</p>
Educational program orientation	Educational and professional
Main focus of educational program and specialization	<p>Special education and training in the field of Power engineering, electrical engineering and electromechanics.</p> <p>Keywords: power, electrotechnical and electromechanical systems, complexes, devices and equipment, control systems for transmission and distribution of electric energy</p>
Program features	The laboratory workshop is carried out on a stationary equipment and with the involvement of specialists of such companies as Schneider Electric, ABB, Siemens and others.
4 – Professional status of graduates and access to further study	
Professional status	<p>Occupations, professional titles of work (according to the current version of the National Classifier of Ukraine: Classifier of professions (DK 003:2010).</p> <p>Electrical technicians (3113):</p> <ul style="list-style-type: none"> - power plant manager; - electrician of precinct; - electrician of department; - power engineer; - production engineer; - power engineer of precinct; - power engineer of department; - energy dispatcher; - technician for the operation of bioenergy installations; - technician for operation of hydropower plants; - technician for the operation of wind power plants; - technician-electrician; - energy technician; - specialist in the operation of power plants, power plants and networks; - specialist in energy management
Access to further study	Master's Degree
5 – Instruction and assessment	
Teaching and learning	Lectures, laboratory classes, practical classes, independent work on the basis of textbooks, manuals and lecture notes, consultations with teachers, preparation of bachelor's paper defense.
Assessment	Written exams, lab reports, presentations, current control, protection of qualification work.
6 – Program competencies	
Integral competence	Ability to solve specialized problems and solve practical problems during professional activities in the field of power engineering, electrical engineering and electromechanics or in the process of training, which involves the application of theories and methods of

	physics and engineering sciences, characterized by the complexity and uncertainty of conditions.
General competencies, defined by the standard	<p>01. Ability to think abstractly, analyze and synthesize.</p> <p>02. Ability to apply knowledge in practical situations.</p> <p>03. Ability to communicate in the state language both orally and in writing.</p> <p>04. Ability to communicate in a foreign language .</p> <p>05. Ability to search, process and analyze information from various sources.</p> <p>06. Ability to identify, ask and solve problems.</p> <p>07. Ability to work as a team.</p> <p>08. Ability to work autonomously.</p> <p>09. Ability to realize their rights and responsibilities as a member of society, to realize the values of civil (free democratic) society and the need for its sustainable development, the rule of law, rights and freedoms of man and citizen in Ukraine.</p> <p>10. Ability to preserve and multiply moral, cultural, scientific values and achievements of the society on the basis of understanding of history and patterns of development of the subject area, its place in the general system of knowledge about the nature and society and in the development of society, technology and technologies, to use different types and forms of motor activity for active rest and healthy living.</p>
General competencies, defined by the higher education institution	<p>11. Ability to use the basic provisions of conflictology and conflict management technology in conflict analysis.</p> <p>12. Ability to formulate a system of knowledge about the city as a whole organism, spanning three subsystems: environmental, technical and social.</p> <p>13. Ability to analyze and solve problems in the field of economic and social-labor relations.</p> <p>14. Ability to identify knowledge and understanding of the fundamentals of the modern economy at the micro, meso, macro and international levels.</p> <p>15. Ability to use rational-critical thinking to analyze political events of today.</p> <p>16. Ability to protect the rights and legitimate interests of participants in economic relations.</p> <p>17. Ability to protect intellectual property.</p> <p>18. Ability to analyze social reality through the lens of sociological rational thinking.</p> <p>19. Ability to understand the principles and rules of law and apply them in professional activities.</p>
Professional competence of specialty, defined by the higher education institution	<p>01. Ability to solve practical problems using computer aided design and calculation (CAD) systems.</p> <p>02. Ability to solve practical problems involving the methods of mathematics, physics and electrical engineering.</p> <p>03. Ability to solve complex specialized problems and practical problems related to the operation of electrical systems and networks, electrical parts of substations and high voltage engineering.</p> <p>04. Ability to solve complex specialized problems and practical problems related to problems of metrology, electrical</p>

	<p>measurements, operation of automatic control devices, relay protection and automation.</p> <p>05. Ability to solve complex specialized problems and practical problems related to the operation of electric machines, apparatus and automated electric drive.</p> <p>06. Ability to solve complex specialized problems and practical problems related to problems of electricity generation, transmission and distribution.</p> <p>07. Ability to develop projects of electric power, electrotechnical and electromechanical equipment in compliance with the requirements of legislation, standards and terms of reference.</p> <p>08. Ability to perform professional duties in compliance with the requirements of safety, occupational, industrial and environmental regulations.</p> <p>09. Awareness of the need to increase the efficiency of electric power, electrical and electromechanical equipment.</p> <p>10. Awareness of the need to constantly expand our knowledge of new technologies in electricity, electrical engineering and electromechanics.</p> <p>11. Ability to quickly take effective measures in emergency situations in power and electromechanical systems.</p>
<p>Professional competence of specialty, defined by the higher education institution</p>	<p>12. Willingness to monitor compliance of developed projects and technical documentation with standards, specifications and other regulatory documents, to evaluate environmental and physiological impact on energy efficiency of electrical engineering systems, and to develop measures that contribute to saving resources.</p> <p>13. Ability to compile mathematical models of electricity processes and objects and analyze them for adequacy.</p> <p>14. Ability to draw plans for the installation, commissioning and operation of electrical equipment.</p> <p>15. The ability to identify promising directions for the introduction of new electrical equipment in the technological processes of electricity.</p> <p>16. Willingness to calculate and design power supply systems to meet the challenge of using computer skills and information technology to design industrial and civilian businesses and structures.</p> <p>17 Ability to perform engineering calculations of modern typical electronic devices of information electronics and conversion technology, to make the choice of electronic devices for them, to use programmable (microprocessor) control devices, to analyze the physical processes occurring in the devices.</p>
<p>7 – Program learning outcomes</p>	
<p>Program learning outcomes defined by the standard</p>	<p>01. To know and understand the principles of operation of electrical systems and networks, power equipment of power plants and substations, protective earth and lightning protection devices and be able to use them to solve practical problems in professional activity.</p> <p>02. To know and understand the theoretical basics of metrology and electrical measurements, the principles of operation of devices of automatic control, relay protection and automatics, have the skills to make appropriate measurements and use these devices to solve professional problems.</p>

	<p>03. To know the principles of operation of electric machines, devices and automated electric drives and be able to use them to solve practical problems in professional activity.</p> <p>04. To know the principles of operation of bioenergy, wind energy, hydropower and solar power plants.</p> <p>05. To know the basics of electromagnetic field theory, methods of calculating electric circuits, and be able to use them to solve practical problems in professional activity.</p> <p>06. To apply application software, microcontrollers and microprocessor technology to solve practical problems in your professional career.</p> <p>07. To carry out the analysis of processes in the electric power, electrotechnical and electromechanical equipment, corresponding complexes and systems.</p> <p>08. To select and apply suitable methods for the analysis and synthesis of electromechanical and power systems with specified parameters.</p> <p>09. To be able to evaluate energy efficiency and reliability of electrical power, electrical and electromechanical systems.</p> <p>10. To find the necessary information in scientific and technical literature, databases and other sources of information, to evaluate its relevance and reliability.</p> <p>11. To communicate freely with professional problems in the state and foreign languages, verbally and in writing, discuss the results of professional activity with specialists and non-specialists, and substantiate your position on discussion issues.</p> <p>12. To understand the basic principles and tasks of the technical and environmental safety of electrical and electromechanical objects, and take them into account when making decisions.</p> <p>13. To understand the importance of traditional and renewable energy for the successful economic development of the country.</p> <p>14. To understand the principles of European democracy and respect for citizens' rights and take them into account when making decisions.</p> <p>15. To understand and demonstrate good professional, social and emotional behavior, adhere to a healthy lifestyle.</p> <p>16. To know the requirements of regulatory acts relating to engineering activities, protection of intellectual property, labor protection, safety and industrial sanitation, and take them into account when making decisions.</p> <p>17. To solve complex specialized tasks in the design and maintenance of electromechanical systems, electrical equipment of power stations, substations, systems and networks.</p> <p>18. To be able to learn independently, acquire new knowledge and improve skills in working with modern equipment, measuring equipment and application software.</p> <p>19. To apply suitable empirical and theoretical methods to reduce electricity losses in its production, transportation, distribution and use.</p>
<p>Program learning outcomes defined by the higher education institution</p>	<p>20. To define mathematical methods for solving problems of electricity.</p> <p>21. To solve practical problems of designing power supply systems of cities and industrial enterprises.</p>

	<p>22. To solve practical problems of designing power supply systems of industrial area.</p> <p>23. To improve professional skills in the installation, adjustment and operation of electrical equipment.</p> <p>24. To be able to search and analyze the source data for the calculation and design of consumer power systems, the operation of automatic controls, relay protection and automation.</p> <p>25. To understand the principles of economic science, especially the functioning of economic systems.</p> <p>26. To apply professional conflict management skills, tools and strategies for managing and resolving them.</p> <p>27. To analyze the role and importance of the modern city in the context of global and local challenges.</p> <p>28. To apply the basic principles of political science in solving professional problems.</p> <p>29. To apply the basic principles and methods of sociological science in solving professional problems.</p> <p>30. To use normative and legal acts regulating professional activity.</p> <p>31. To analyze the processes of legal and market regulation of socio-economic labor relations.</p> <p>32. To have basic methods of protection of intellectual property; apply the rules of registration of intellectual property rights.</p> <p>33. To communicate effectively in a foreign language in a business environment.</p> <p>34. To apply language, language, linguosocio-cultural and communication skills for effective communication in a foreign language.</p> <p>35. To be able to use regulatory acts that regulate the legal support of economic relations.</p> <p>36. Skills in the use of semiconductor electronic devices and integrated circuits in power devices and systems; possession of methods of calculation of typical devices of conversion engineering and information electronics including on the basis of microprocessor devices.</p>
8 – Resource support for program implementation	
Staffing	The educational program is provided by scientific and pedagogical staff: 5 doctors of science, 7 candidates of sciences. All teachers of the profile graduation department have undergone scientific-pedagogical training for a few weeks to 6 months.
Logistics	At the Department of Power Supply and Power Consumption, 3 specialized laboratories have been set up and are operating successfully, which fully meet the modern requirements. Laboratory «Electric drive and electric apparatus» created in conjunction with Schneider Elektrik and ABB to research and study major modern models of electric motors and switching equipment. Laboratory «Digital Devices and Relay Protection» created with JSC Kharkivoblenergo for the study and practical implementation of modern digital devices in electrical networks. Laboratory «Power stations and substations», it was also created with JSC Kharkivoblenergo to study the basic technical characteristics of electrical equipment for its rational use.

Information and methodological support	All the disciplines taught are provided with educational literature. The system of distance learning is implemented and modern software is widely used.
9 – Academic mobility	
National credit mobility	Opportunity to participate in national credit mobility programs at other universities in the country where bachelors are trained in the specialty 141 Power engineering, electrical engineering and electromechanics, in the framework of educational trainings, with the possibility of crediting educational achievements in the programs of technological, industrial and undergraduate practice (total up to 11 ECTS credits)
International credit mobility	Opportunity to participate in Erasmus + International Credit Mobility international credit mobility programs with Middle Eastern University of Technology (Ankara, Turkey), Lodz Technical University (Lodz, Poland)
Training of foreign higher education applicants	